



CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory
NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.12/KRIDL/AGG/2013-14

: 11.01.2014

TEST REPORT ON COARSE AGGREGATES IS 383-1970 (RA- 2002)



Client : Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
Agency : Technical Manager (West), KRIDL, Bangalore.
Name of Work : Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference : BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Date of Testing : 11.01.2014
Material : 40mm Aggregates

Total Wt. of Aggregates in gms **25600**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits
80	0	0	0	100	100
40	1010	3.95	3.95	96.05	95-100
20	15785	61.66	65.61	34.39	30-70
10	5940	23.20	88.81	11.19	10-35
4.75	2456	9.59	98.40	1.60	0-5

Note:

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ಶಿಬ್ಬಕಟ್ಟೆ ಸುವವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
ಎಸ್.ಎಂ ರಸ್ತೆ, ಕವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು.

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CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory
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Job No.: CTCE/BBMP/W.No.12/KRIDL/STEEL/2013-14

16.01.2014

TEST REPORT ON REINFORCEMENT STEEL



Client : Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.

Agency : Technical Manager (West), KRIDL, Bangalore.

Name of the work : Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.

Reference : BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014

Date of Test : 16.01.2014

Technical Reference : IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm ²	Tensile strength (Ultimate stress) N/mm ²	Elongation percent gauge length		
1	8	0.40	510	540	12.80	O.K	O.K

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Job No.: CTCE/BBMP/W.No.12/KRIDL/STEEL/2013-14



16.01.2014

TEST REPORT ON REINFORCEMENT STEEL

Client : Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.

Agency : Technical Manager (West), KRIDL, Bangalore.

Name of the work : Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.

Reference : BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014

Date of Test : 16.01.2014

Technical Reference : IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm ²	Tensile strength (Ultimate stress) N/mm ²	Elongation percent gauge length		
1	10	0.62	513	544	13.15	O.K	O.K

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Job No.: CTCE/BBMP/W.No.12/KRIDL/CUBE/2013-14



17.02.2014

TEST REPORT ON CONCRETE CUBES

Client : Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
Agency : Technical Manager (West), KRIDL, Bangalore.
Name of the work : Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference : BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Sample ID : RCC Drain Concrete
Size of cubes : 150mmx150mmx150mm
Cross Sectional Area : 22500 mm²
Technical Reference : IS: 516-1959 (Reaffirmed 2008)
Grade of Concrete : M₂₀
Compressive Strength as on : 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm ²)
1	20.01.2014	17.02.2014	8.452	512.4	22.77
2	20.01.2014	17.02.2014	8.399	485.6	21.58
3	20.01.2014	17.02.2014	8.275	478.2	21.25

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Job No: CTCE/BBMP/W.No.12/KRIDL/BM(QB)/2013-14

24.03.2014



TEST REPORT

CLIENT	:	Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
AGENCY	:	Technical Manager (West), KRIDL, Bangalore.
NAME OF THE WORK	:	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	:	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
SAMPLE ID	:	Bitumen
DATE OF TESTING	:	24.03.2014

The results of the tests conducted on the bitumen sample for Bituminous Macadam

Sl. No	Description	Test Result	Requirement as per IS:73:2006
1	Penetration at 25 °C, 1/10 mm	85	80 to 100
2	Softening point, °C	56	Min. 40
3	Ductility at 27°C, cm	100 >	Min. 75
4	Flash Point, °C	381	Min. 220



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ಜಿಲ್ಲಾಕಲ್ಯಾಣ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
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24.03.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
Agency	Technical Manager (West), KRIDL, Bangalore.
Name of the Work	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Bituminous Macadam
Date of Testing	24.03.2014

Sl No.	Details	Trial No.			Average
		1	2	3	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	381	382	383	21.60
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	82	83	82.5	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299	300.5	
4	Aggregate Impact value = percent fines	21.52	21.73	21.54	
	$100 * (W_2/W_1) \%$				

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Macadam is 30%

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ಪ್ರಯೋಗಗಳನ್ನು ನಡೆಸಿ, ದಾಖಲೆಗಳನ್ನು ಪರಿಶೀಲಿಸಿ
ಪ್ರಯೋಗಗಳನ್ನು ಮುಂದುವರಿಸಲು
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Job No: CTCE/BBMP/W.No.12/KRIDL/BM/AIV/2013-14



24.03.2014

Aggregate Impact Value IS: 2386 Part IV

Client	Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
Agency	Technical Manager (West), KRIDL, Bangalore.
Name of the Work	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Bituminous Macadam
Date of Testing	24.03.2014

Sl No.	Details	Trial No.			Average
		1	2	3	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	378	378.5	21.97
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	84	83	82.5	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	295	295	296	
4	Aggregate Impact value = percent fines	22.16	21.96	21.80	
	$100 * (W_2/W_1) \%$				

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Macadam is 30%

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Job No: CTCE/BBMP/W.No.12/KRIDL/BM/Shape.T/2013-14

: 25.03.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
Agency	: Technical Manager (West), KRIDL, Bangalore.
Name of Work	: Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	: BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Bituminous Macadam
Date of Testing	: 25.03.2014



Flakiness Index = 12.85%

Elongation Index = 13.45%

Result : Combined Flakiness & Elongation index 26.30%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Macadam is 30%

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Job No: CTCE/BBMP/W.No.12/KRIDL/BM/Shape.T/2013-14

: 25.03.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
Agency	: Technical Manager (West), KRIDL, Bangalore.
Name of Work	: Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	: BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Bituminous Macadam
Date of Testing	: 25.03.2014



Flakiness Index = 12.85%

Elongation Index = 13.78%

Result : Combined Flakiness & Elongation index 26.63%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Macadam is 30%

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JobNo: CTCE/BBMP/W.No.12/KRIDL/BM/Stripping/2013-14

26.03.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
Agency	Technical Manager (West), KRIDL, Bangalore.
Name of the work	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Type of Mix	Bituminous Macadam
Date of Testing	26.03.2014



Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Macadam is 95%

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ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
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26.03.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
Agency	Technical Manager (West), KRIDL, Bangalore.
Name of the Work	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Source / Location	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	26.03.2014



Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 2	
1	Weight of aggregate suspended in water with the basket	$W_1 g$	2024	2025	2026	
2	Weight of basket suspended in water	$W_2 g$	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s g$	1274	1275	1276	
4	Weight of saturated surface dry aggregate in air	$W_3 g$	2032	2033	2034	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s) g$	758	758	758	
6	Weight of oven dried aggregate	$W_4 g$	2017	2016	2015	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.661	2.660	2.658	2.660
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.715	2.721	2.727	2.721
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.74%	0.84%	0.94%	0.84%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Macadam is 2.0%

Note:

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CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.12/KRIDL/BM/Bitumen/2013-14

26.03.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS MACADAM MIX AASHTO T 164 & AASHTO T 30

CLIENT	Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
AGENCY	Technical Manager (West), KRIDL, Bangalore.
NAME OF THE WORK	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
SAMPLE I/D	Roads in Ward No. 12
DATE OF TESTING	26.03.2014



BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	482.5	482
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	17.5	18.00
7. Bitumen content in %	3.50	3.60
8. Average	3.55	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
26.5	0	0	0	100	100
19	28.46	5.90	5.90	94.10	90-100
13.2	163.84	33.96	39.85	60.15	56-88
4.75	175.62	36.40	76.25	23.75	16-36
2.36	45.31	9.39	85.64	14.36	4-19
0.3	35.29	7.31	92.96	7.04	2-10
0.075	13.15	2.73	95.68	4.32	0-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
26.5	0	0	0	100	100
19	26.83	5.37	5.37	94.63	90-100
13.2	154.78	30.96	36.32	63.68	56-88
4.75	172.43	34.49	70.81	29.19	16-36
2.36	85.32	17.06	87.87	12.13	4-19
0.3	31.42	6.28	94.16	5.84	2-10
0.075	12.78	2.56	96.71	3.29	0-8

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→ The results indicated
→ Any Query regarding
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66

JobNo: CTCE/BBMP/W.No.12/KRIDL/BM/Agg.G/2013-14

26.03.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	Asst. Executive Engineer, Shettyhalli Sub Division, BBMP, Bangalore.
Agency	Technical Manager (West), KRIDL, Bangalore.
Name of the work	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Sample ID	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	26.03.2014



Total Weight of Sample: 5200 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
26.5	0	0	0	100	100	Gradation satisfies Grade-II MORTH specification
19	362	6.96	6.96	93.04	90-100	
13.2	1685	32.40	39.37	60.63	56-88	
4.75	1488	28.62	67.98	32.02	16-36	
2.36	969	18.63	86.62	13.38	4-19	
0.3	386	7.42	94.04	5.96	2-10	
0.075	142	2.73	96.77	3.23	0-8	

Total Weight of Sample: 5300 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
26.5	0	0	0	100	100	Gradation satisfies Grade-II MORTH specification
19	296	5.58	5.58	94.42	90-100	
13.2	1783	33.64	39.23	60.77	56-88	
4.75	1525	28.77	68.00	32.00	16-36	
2.36	895	16.89	84.89	15.11	4-19	
0.3	412	7.77	92.66	7.34	2-10	
0.075	153	2.89	95.55	4.45	0-8	

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